Fisheries and Oceans Canada | Pêches et Océans Canada

NOAA FISHERIES
NATIONAL MARINE FISHERIES SERVICE

CERT

Comité d'évaluation des ressources transfrontalières

Comptes rendus 2005/02

TRAC

Transboundary Resource Assessment Committee

Proceedings 2005/02

Transboundary Resources Assessment Committee (TRAC)

Report of Meeting held
14 - 17 June 2005

Hachey Conference Centre
St. Andrew's Biological Station
St. Andrew's, New Brunswick, Canada

Meeting Chairpersons

R. O'Boyle
Fisheries and Oceans Canada
Bedford Institute of Oceanography
Dartmouth, Nova Scotia
Canada

W. Overholtz
National Marine Fisheries Service
Northeast Fisheries Science Center
Woods Hole, Mass.
USA

October 2005

Ce document est disponible sur l'Internet à : This document is available on the Internet at :
http://www.mar.dfo-mpo.gc.ca/science/TRAC/trac.html

Canada

FOREWORD

The purpose of these proceedings is to archive the activities and discussions of the meeting, including research recommendations, uncertainties, and to provide a place to formally archive official minority opinions. As such, interpretations and opinions presented in this report may be factually incorrect or mis-leading, but are included to record as faithfully as possible what transpired at the meeting. No statements are to be taken as reflecting the consensus of the meeting unless they are clearly identified as such. Moreover, additional information and further review may result in a change of decision where tentative agreement had been reached.

AVANT-PROPOS

Le présent compte rendu fait état des activités et des discussions qui ont eu lieu à la réunion, notamment en ce qui concerne les recommandations de recherche et les incertitudes; il sert aussi à consigner en bonne et due forme les opinions minoritaires officielles. Les interprétations et opinions qui y sont présentées peuvent être incorrectes sur le plan des faits ou trompeuses, mais elles sont intégrées au document pour que celui-ci reflète le plus fidèlement possible ce qui s'est dit à la réunion. Aucune déclaration ne doit être considérée comme une expression du consensus des participants, sauf s'il est clairement indiqué qu'elle l'est effectivement. En outre, des renseignements supplémentaires et un plus ample examen peuvent avoir pour effet de modifier une décision qui avait fait l'objet d'un accord préliminaire.

106-07166/

TABLE OF CONTENTS

ABSTRACT / RÉSUMÉ ii

INTRODUCTION 1

METHODOLOGY TO ESTIMATE TOTAL CATCH IN US FISHERY 1

DISCARD ESTIMATES IN CANADIAN FISHERY 4

5Zjm COD 6

5Zjm HADDOCK 9

MODIFIED TAC STRATEGY FOR EASTERN GEORGES BANK HADDOCK 13

5Zhjmn YELLOWTAIL 14

DFO SURVEY COMPARATIVE FISHING 19

APPENDICES 20
Appendix 1. List of Participants 20
Appendix 2. Meeting Terms of Reference 21
Appendix 3. Meeting Agenda 22
Appendix 4. Minutes of Public Meeting in Yarmouth, Nova Scotia on 26 May 2005 23

ABSTRACT

The Transboundary Resources Assessment Committee (TRAC) met during 15 – 17 June 2005 in St. Andrew's, New Brunswick, Canada to review updated assessments (through 2004) of Eastern Georges Bank, Eastern Georges Bank haddock, and Georges Bank yellowtail flounder, and to consider a number of related scientific issues. Results of the meeting will be used by the Transboundary Management Guidance Committee (TMGC) in developing management guidance for the 2006 fishing year for these transboundary resources.

RÉSUMÉ

Le Comité d'évaluation des ressources transfrontalières (CERT) s'est réuni du 15 au 17 juin 2005 à St. Andrew's, au Nouveau-Brunswick (Canada), pour examiner les mises à jour (jusqu'en 2004) des évaluations des stocks d'aiglefin et de morue de l'est du banc Georges ainsi que de limande à queue jaune du banc Georges et pour se pencher sur divers questions scientifiques connexes. Les résultats de cette réunion serviront au Comité d'orientation de la gestion des stocks transfrontaliers (COGST) à élaborer ses documents d'orientation concernant ces ressources transfrontalières pour l'année de pêche 2006.

INTRODUCTION

The TRAC Co-chairs, R. O'Boyle and W. Overholtz, welcomed participants (Appendix 1), noting that the first TRAC meeting was held in 1998. The TRAC receives its remit from the Transboundary Management Guidance Committee (TMGC). The TRAC review process is two tiered, a change introduced in 2002: annual assessment reviews are undertaken between more intensive, periodic benchmark reviews. The benchmark for Eastern Georges Bank cod was established in February 2002, while that for Eastern Georges Bank haddock was established in 1998. Yellowtail benchmark discussions were conducted during 25 – 26 January (data inputs) and 26 – 29 April 2005 (model formulations). This meeting will be applying these benchmarks to the most recent data on these resources to produce assessments to guide fisheries management in 2005/06.

Participants were reminded (a) that the TRAC is a forum for scientific review; (b) that management issues would not be considered; and (c) that the TRAC deliberations and conclusions would not be finalized until the TSRs had been made public.

The Terms of Reference and Agenda for the meeting are provided in Appendices 2 and 3, respectively. During the meeting, each working paper was presented by one of the authors, followed by a plenary discussion of that paper. Rapporteurs documented these discussions for the Proceedings.

In preparation for this meeting, Canadian scientists met with fishermen in Yarmouth, NS on 26 May 2005. The minutes of this meeting are provided in Appendix 4.

METHODOLOGY TO ESTIMATE TOTAL CATCH IN US FISHERY

Working Papers:

Caless, D., K. Wilhelm, and S. Wang. 2005. Methodology for Evaluating US Catch in the US/Canada Shared Resource Area. TRAC Working Paper 2005/09.

Brodziak, J., S. Correia, and T. Nies. 2005. In-season estimation of yellowtail flounder discards by U.S. vessels fishing in the US/Canada area on Georges Bank. TRAC Working Paper 2005/10.

Rapporteur: T. Warren

Presentation Highlights

Working Paper (1)

Reported catch was calculated by summing VMS-reported kept and discard data daily by group. We were concerned about the reliability of the self-reported discard data.

Estimated catch was calculated for each species and group as the sum of the reported kept catch and estimated discard. VMS-reported kept catch was considered reliable

and so was used. VMS-reported discard data may not be reliable because they were self-reported and could not be confirmed; consequently, discard was estimated using observer data. For each program, area, species and DAS category, the ratio of the sum of observer-reported discarded catch to the sum of observer-reported kept catch was calculated using observer trips over the preceding 35 days. This discard ratio was applied to each trip's VMS kept catch to estimate the discarded catch. If there was a program opening or major change, the first 35 day ratio was applied to all the trips during the first 35 days, rather than the ratio based on preceding observer trips only. If the reported kept was zero or a discard fishery was in place, the average daily observed discard from the previous 35 days was used to estimate discard. Catch from missing VMS reports was estimated by comparing daily total trip counts to catch report trip counts and applying it to estimated catch. VMS yellowtail kept data were statistically compared to the official dealer record for verification. Vessel Trip Report data were used to estimate yellowtail catch from non-VMS vessels.

Working Paper (2)

This working paper reviewed a preliminary method used to estimate yellowtail flounder discards. The preliminary method estimated discard from the kept catch times the average discard to kept ratio, averaged over trips. A review of current literature on discard estimation suggested that using the average discard to kept ratio was not recommended because it was less efficient and potentially more biased than alternatives, such as the ratio of means estimator (sum of discard over sum of catch) across trips. A comparison of the average rate and ratio of means estimators applied to the 2004 yellowtail flounder fishery data for the U.S./Canada area on Georges Bank suggested that higher discards would have been estimated using the average rate approach.

Discussion

Working Paper (1)

There was an explanation of various aspects of the U.S. fishery in the U.S./Canada Management Area. Category A DAS may be used in an unrestricted manner, whereas Category B DAS have associated restrictions in location, area, or trip limits of stocks of concern. For example Regular B DAS may be used in a program where there is no area restriction, but relatively low trip limits on stocks of concern. Vessels in the Eastern U.S./Canada Area (cod and haddock area) may not fish inside and outside of this area on the same trip. Vessels may fish inside and outside of the Western U.S./Canada Area on the same trip.

The methodology used to track the catch in the U.S./Canada Management Area changed during the 2004 fishing year. During the first portion of the fishing year (May-Jan) the average of ratios was used to calculate discards. During the second portion of the fishing year the ratio of sums was used. The final estimate of catch for the fishing year (retrospective estimate) used the ratio of sums method, and represents the information included in the report. The plan for the future is to use the ratio of sums. The ratio of the sums does not treat each trip the same, and is less subject to bias from

large discard events. It was noted that the methods discussed are for the purpose of in-season monitoring for management purposes, and such methods are distinct from the methods used in stock assessment. The estimate of catch developed by these monitoring methods is posted on the NMFS web-site. To calculate discards in the assessment, dealer data are used (prorated by stock area with Vessel Trip Report (VTR) data. Because the VTR data are not obtained in a timely manner, they are not useful for in-season monitoring. The monitoring method estimates catch on a fishing year basis, whereas the assessment is based on a calendar year.

There has been no comparison done between the catch estimate produced by the monitoring methods and that produced using assessment methods. This comparison could be done on a quarterly basis.

There has been no look at whether there is observer bias on observed trips. More discussion of methods: Area provided from VTR for assessments. VMS provides area for in-season monitoring. Discard estimates from observed trips. VMS underestimates trips.

Discussion of whether this method of monitoring is adequate. Need to compare to assessment data to make a conclusive evaluation. No simulation study done. It was later concluded that the comparison should be done on a large scale basis due to the problem of comparing strata that are different. The comparison will be presented with the yellowtail assessment presentation.

The problem of over-stratification and low number of observer samples mentioned; this issue common to U.S. and Canada.

In response to the TMGC request to evaluate the method used, the approach looks reasonable. Other approaches could be used, and a future TRAC should look at related questions (e.g. appropriate time period for rolling average, use of logarithmic scale of average ratios, relation to seasonal patterns in discards and relation to level of observer coverage). Some of the avenues of future exploration are elements discussed in the draft paper (Brodziak, et. al., 2005).

Working Paper (2)

The average rate discard estimator was found to be sensitive to outlier discard to kept ratios across trips. In this case, the average rate estimates can overestimate actual discards. This occurs when the distribution of discard to kept is positively skewed. In general, when a fishery program targets yellowtail flounder and there is a proportional relationship between kept and discarded catch, the ratio of means estimator is appropriate for discard estimation. In contrast, when a fishery program does not target or land yellowtail flounder, it is more appropriate to use a method that can account for trips with no landed yellowtail catch. For example, the mean-per-trip estimator can be used for discard estimation when none of the yellowtail catch is landed.

DISCARD ESTIMATES IN CANADIAN FISHERY

Working Papers:

Gavaris, S., and L. Van Eeckhaute. 2005. Estimation of cod, haddock and yellowtail flounder discards from the Canadian Georges Bank scallop fishery. TRAC Working Paper 2005/11.

Gavaris, S. 2005. Determination of discards of Georges Bank cod for 2004 from species composition comparison. TRAC Working Paper 2005/12 [Appendix].

Rapporteur: R.K. Smedbol

Presentation Highlights

Working Paper (1)

Discards of cod, haddock and yellowtail flounder due to the Canadian scallop fishery have not previously been included in the assessments. Discards are not reported in Canadian fishery statistics. Any by-catch that is not landed, i.e. not recorded in fishery statistics, was designated as "discards". Inclusion of discards must be consistent over the entire assessment time series. Discards cannot be included in some years and left out in others. Accordingly, attempts were made to derive discard estimates for all years.

Three common approaches for estimating discards are based on prorating observed discards by the ratio of either:

- landed cod, haddock or yellowtail to observed landed cod, haddock or yellowtail
- scallop effort to observed scallop effort
- landed scallop to observed landed scallop.

The reliability of discard estimates suffered due to very sparse at-sea monitoring prior to 2001, and particularly prior to 1996. It was necessary to invoke unverifiable assumptions about patterns in discard rates when information and data were lacking. Starting in late 2004, there was an increase in observer coverage of the scallop fleet which should allow direct estimation of discards in future without invoking unverifiable assumptions.

For 1996-2004, when landing of cod, haddock and yellowtail flounder in the scallop fishery was not permitted, observed discards were prorated by the ratio of effort in the scallop fishery to observed effort to obtain an estimate of discards. Available data did not support any unit area trends in discard rates. There appeared to be seasonal patterns in discard rates that were consistent with seasonal patterns of landings per unit of effort. Therefore the proration was conducted by quarter. Quarterly discard rates for periods when no observed trips were available were derived by interpolation and application of a seasonal pattern.

For the pre-1996 period when landing of cod, haddock and yellowtail flounder in the scallop fishery was permitted, the number of observed trips was very limited and the

ratios would be subject to influence by anomalous outliers. Therefore it was considered prudent to compare results from all three proration approaches. The discard estimates based on the discard to landed ratio did not appear consistent with the amount of effort. The discard estimates based on discard to effort ratio and discard to landed scallop ratio were fairly comparable. The landed scallop proration appeared somewhat susceptible to variation in scallop abundance, e.g. discards declined when scallop catch declined while effort remained high and yellowtail abundance was thought to have remained relatively stable. The effort proration results appeared most consistent of the three approaches. The seasonal factors applied in the 1996-2003 period were not used because that refinement was not considered warranted given the other limitations of the available information for this period.

Working Paper (2)

An approach similar to that used to analyze previous year's data was applied to compare species composition of observed and unobserved trips for evidence of cod discarding in 2004. Comparisons for the 4th quarter were not included because observer were suspected of not being representative. Based on the comparison of the observed and unobserved ratio of cod to haddock plus pollock, after accounting for zone and quarter effects, the hypothesis that discarding did not occur, for either otter trawl or longline fisheries, could not be rejected.

Discussion

Working Paper (1)

During the recent benchmark assessment for yellowtail it was noted that in recent years there had been few scallop trips wherein the by-catch of yellowtail, cod and haddock had been monitored by fishery observers. The benchmark output included a recommendation to increase observer coverage to an amount that would be sufficient to estimate the by-catch of yellowtail (approximately 10 % of total trips).

The authors were asked whether the by-catch of cod and haddock exhibited any seasonal patterns. By-catch rates were higher during the winter period (first quarter of the year), but decreased during the summer. This seasonal pattern was applied in the by-catch estimate.

Working Paper (2)

It was noted that observer deployment in the Canadian fishery is determined by Fisheries and Aquaculture management, and not by Science. Fleet coverage is not random or representative. The deployment of observers may be used to track specific vessels. Also, if a vessel crew does not use a separator panel in its otter trawl gear, by regulation the vessel must take an observer aboard for the trip. Industry representatives noted that the fleet tries to avoid catching cod for most of the season, in order to fill their haddock quota. Toward the end of the fishing season, vessels turn to catching their quota of cod. They may fish without the separator panel, and thus request an observer for the trip in question. This pattern in fishing behaviour results in

greater observer coverage during the 4th quarter, and these trips may not be representative of fleet activities during the year.

The Committee recommended that this issue of representative observer coverage be raised with DFO Fisheries and Aquaculture Management.

5Zjm COD

Working Paper:

Hunt, J.J., B. Hatt, and L. O'Brien. Population Status of Eastern Georges Bank Cod (Unit Areas 5Zj,m) for 1978 – 2005. TRAC Working Paper 2005/13.

Rapporteur: R. Mayo

Presentation Highlights

TRAC reviewed information on the Canadian and USA commercial cod fisheries, research survey indices of abundance and estimates of discards. Population status was estimated using ADAPT with updated indices and revised catch at age in the benchmark formulation. Reported landings in 2004 were about 2,300 t, a decrease of about 1,000 t over 2003. It was noted that the most of the USA landings were taken in the first half of the year and prior to implementation of management measures for the 2004-2005 USA fishery year. The 1998 year-class continued to account for over 20% of the catch at age. Differences in the 2004 age composition between Canada and USA catches were noted with Canada taking proportionately more fish at age 3 and at ages 6+.

Estimates of cod discards in 1978-2004 from the Canadian scallop and groundfish fisheries and the USA bottom trawl fishery were presented. Methodology for deriving these estimates had been reviewed at TRAC 2003 and as part of the yellowtail benchmark review. Limited sampling information and model derivation of discard estimates gives them considerable uncertainty. Catch at age associated with the discard estimate was included in the total catch at age used in the assessment. Sensitivity analysis of assessment results with discards included indicated relatively small differences in population estimates from those derived without discards in the catch at age. Even with high uncertainty in the estimates, inclusion of discards in the assessment was considered appropriate and consistent with the management practice of discounting TACs by the expected amount of discarding.

Results for the NMFS fall 2004 and spring 2005 and for the DFO spring 2005 surveys were presented. The NMFS fall 2004 survey shows an increase over the 2003 observation with substantial numbers at age 1 (the 2003 year-class). The DFO spring 2005 survey also increased in 2005 with relatively high numbers at age 2 (the 2003 year-class) and age 4. The NMFS spring 2005 survey declined from 2004.

Overall, the adult population biomass has declined from the recent high in 2001 (18,800t) to about 14,300t at the beginning of 2005. The exploitation rate has been above the F_{ref} of 0.18 in the last few years but declined from 22.8% in 2003 to 13.7%, below the F_{ref} =15%, in 2004. Assuming a catch in 2004 of about 1,000t (equal to the 2005 TAC) will result in projected yield at the F_{ref} in 2006 of about 2,200t with an expected increase in adult biomass. Mid-term projections show a continuing increase in yield to about 3,000t, followed by a decline as the 2003 year-class moves through the fishery.

Most of the positive indications in stock status are associated with the 2003 year-class. The estimated recruitment of over 9 million at age one for this year-class is well above the recent average and over 50% of the projected 2006 yield comes from recruitment of the year-class to the fishery. Projected population biomass increases over the next few years are also strongly influenced by the estimate for the 2003 year-class. However, the estimated abundance of the 2003 year-class at the beginning of 2006 has relatively low precision and a high degree of uncertainty. This uncertainty is included in the overall uncertainty for yield projections but a particular note of concern should be made in consideration of potential dramatic changes in stock status associated with revised estimates of this year-class.

Discussion

Commercial Fishery Data

Discards from the CDN scallop fishery and from USA OTB fishery were introduced into the assessment for the first time this year. 2003 year-class features prominently at age 0, 1 and 2 compared to previous year-classes.

Were discards to be included in the CAA whether or not there were sufficient samples to characterize the size and age composition, and does the estimation procedure contribute the uncertainty in the assessment results? Sampling in the USA 5Z j and m fishery was very low and length samples were borrowed from the western Georges Bank area. Age samples were from RV surveys and commercial port sampling of the landings. Very little discarding of cod is thought to have occurred in the USA scallop fishery.

It is important to distinguish between the uncertainties about the discards, but the magnitude is low and may not have major implications. The application of the discards in the USA CAA for cod was only for the period since 1989, covering only a portion of the period of the analysis which begins in 1978.

There needs to be a comprehensive approach to incorporating discards into the assessment. While the pieces that have been produced for the current assessments address concerns of the TMGC, the TRAC agreed to look at the methodology and sampling rates upon which the discards are based, perhaps during an intersessional meeting. While the impact of including discards may be seen to be minimal over the past term, the recent low levels of landings from the fishery raises the importance of discards in the estimation of exploitation rates.

While there remain some concerns about the current approach to including discards in the assessments, the TRAC agreed to include the discards in the eastern GB cod and haddock assessments. While the TRAC noted that it would be consistent to include discards in the USA domestic assessments of GB cod and haddock to be conducted in August 2005, TRAC agreed that this decision should be left to the principals responsible for these assessments.

In addressing the second paragraph of the remit for this meeting, TRAC discussed information on the size and age compositions of the Canadian and USA catches but concluded that a full evaluation cannot be conducted at present. A thorough examination of this issue, based on landings and discard data from the past 5-6 years, will be completed by spring 2006.

Sampling of USA landings in 2004 remained relatively high, but the reduction in landings after May 2004 resulted in a sharp reduction in sampling as well. Consequently, samples were pooled over quarter in the second half of the year in order gain sufficient sample size.

Surveys

No comments

Model Results

There was a change in the model structure to account for some anomalous outcomes in the bootstrapping results. This involved including catch at age 11 equal to zero, thereby fixing F = 0 and eliminating the possibility of negative Fs. While the stock size estimate for the 2003 year-class at age 2 in 2005 is quite high, compared to the past decade, the CV on this estimate is also very high, indicating low precision of this estimate. The TRAC observed considerable patterning in the residual patterns, but also noted that is has occurred in past assessments.

The current status appears more optimistic (i.e., lower F, improved recruitment and an expected increase in biomass in the next few years). Is this due to the increases seen in the DFO survey? It appears that, aside from the reduction in F, the improved outlook stems primarily from the appearance of the 2003 year-class.

Projections

The high estimate of the 2003 year-class is included in the medium term (10 years) projections and affects the outcome since it is now part of the average recruitment. However there is no immediate impact on the short term projections for 2006. The considerable uncertainty on the estimate of the size of the year-class casts doubt on the utility of the projections in the out years. TRAC suggests that alternate projections be provided with and without including this year-class in the average.

Calculation of average weights used a three year recent average to account for changes observed in recent years. The domed shaped PR is the same as in the June 2004 assessment. The 2004 fishing mortality at age vector suggests a shift in the maximum F from ages 5 and 6 in 2003 to ages 6 and 7. This may be a temporary event related to the shift in the maximum USA catch towards quarter 1 due to imposition of TACs beginning on May 1.

Rapporteur Report on Reruns

The Canadian CAA in 2004 was dominated by age 3 and 6 whereas USA CAA was dominated by ages 4 and 5. The effect of including discards in the CAA was minimal. There was more influence during the late 1990s when the Canadian otter trawl catch was dominant.

Three variants of the projections were presented:

1) Exclusion of 2003 year-class in calculating the 10-year average recruitment resulted in an average 2.8 million age 0 recruits. This resulted in a yield of 2500 t in 2009.

2) Inclusion of 2003 year-class in calculating the 10-year average recruitment resulted in an average 5.0 million age 0 recruits. This resulted in a yield of 3400 t in 2009.

3) Inclusion of 2003 year-class in calculating the 10-year average recruitment and exclusion of discards from the CAA also resulted in a yield of 3400 t in 2009.

TRAC agreed to include 1 and 2 above in the medium term projection tables.

A retrospective analysis of the agreed VPA formulation revealed only small retrospective patterns over time in F and biomass. The 2005 biomass estimate falls within the lower ellipse of S/R plot but the magnitude of the 2003 year-class is more in line with the upper ellipse.

5Zjm HADDOCK

Working Paper:

Van Eeckhaute, L., and J. Brodziak. Assessment of Eastern Georges Bank Haddock. TRAC Working Paper 2005/14.

Rapporteur: D. Clark

Presentation Highlights

Catches from 1969 to 2004 were presented. High catches peaking at 23,000 mt during the late 70's and early 80's were due to good recruitment but included high discarding levels. Catches subsequently declined and varied about 5,000 mt during the 1980's. Catches have increased since about 1995 to about 11,500 mt in 2004. The catch

includes USA discards and Canadian scallop fishery discards were added from 1969 to 2004. Estimation of scallop fishery discards is detailed in a separate document. Scallop fishery discards are very low and were 93 mt in 2004. The majority of the Canadian catch is taken by OTB <65' with longliners contributing a significant portion.

The Canadian catch was well sampled for lengths and ages. OTB catches peaked at 50.5 to 52.5 cm and longliners peaked slightly higher at 54.5 cm. Canadian catch at age was updated with revised landings for 2001 and 2002 as was the USA catch at age for 2001 to 2003. The Canadian scallop fishery discard catch at age was characterized using the survey age compositions except for 2004 Q3 and Q4 which were characterized from observer samples in those quarters. The age composition of the catch now contains fewer younger aged haddock and more older haddock than is typical of earlier years. The catch at age shows good tracking of year-classes.

Survey distributions at age were consistent with previous 10 year average distributions, however, the very large 2003 year-class was more widely distributed over the survey area than small year-classes, as has been observed for other very large year-classes in the past. The three adult survey indices track each other well. The 2005 spring surveys show a marked decrease in adult biomass from the previous year but the 2004 fall survey is back up after showing a large drop in adult biomass in 2003. The spring 2005 and fall 2004 survey catches of the 2003 year-class were substantially lower than the previous year. The survey catches of the 2004 year-class were low. Older ages have become more abundant in the surveys.

Weights and lengths at age from the DFO survey and Canadian fishery show a marked downward trend since about 2000 for all age groups. There was also a drop in condition over 2004 for most length groups as seen from the DFO survey.

The same ADAPT formulation from the previous year was used. Age 0 catches (discards) were not used in the analysis as they were poorly estimated. Values were low and their effect was negligible. The effect on the population estimate of adding ages 1 and older discards was minimal. Ages 1 and older discards were included in the assessment. Calibration diagnostics were similar to the benchmark. Residuals showed some year effects and cohort effects. There was no persistent retrospective pattern. Relative error on age 1 was large and the bias was substantial. Relative error on other ages was about 30% and the bias was small. The diagnostics were considered acceptable.

Total biomass is at its highest in more than 30 years at about 115,000 mt. 3+ biomass, at 50,000 mt is slightly down from the previous year. The 2003 year-class estimate is substantially lower than the previous year's but is still exceptional. Exploitation rate has been below F_{ref} since 1995. Survivorship of recent year-classes is higher at older ages than it was for larger year-classes which experienced high exploitation at young ages. Population age structure in both percent composition and absolute numbers for recent years reflect improved recruitment and lower exploitation when compared to earlier time periods. Yield was greater than surplus production in 2003 due to the weak 2001 and 2002 year-classes. The increase in 2004 is due to the contribution from the large 2003 year-class at age 2. The adult biomass is at a size where better recruitment has been

observed in the past. Recruits per spawner were low in 2001, 2002 and 2004, similar to the low levels seen in the 1980s. In the 1990s, recruits per spawner were similar to levels seen during the 1931 to 1955 period.

A catch of 22,000 mt would result in a neutral risk that the fishing mortality in 2006 will exceed F_{ref}=0.26. Two medium term projections to 2010 were presented with inputs of 23,000 mt as the 2005 catch, DFO 2005 survey weights at age to represent beginning of year weights at age, the 5-year average (2000 to 2004) or 2004 fishery weights at age to represent catch weights and either 20 million or 40 million recruits at age 1.

Discussion

It was noted that the indices for the 2003 year-class are of record magnitude when we look over the entire 5Z area in all available indices, somewhat different from what we see for 5Zjm, where 2 of the 6 indices are similar to those from the 2000 year-class.

Calculation of scallop by-catch rates was discussed, given the seasonal variation in haddock distribution. Quarterly catch rates were used, obviating this concern.

Weights at age have shown a marked decline. Weight at age is declining and is the lowest in the series at many ages in 2005. Many cohorts show no increase in weight in the past year. This is not related to the large 2003 year-class, since it is across all ages despite differences in diet. This pattern is similar to changes in weights at age for haddock (and other species) in 4X and other areas to the east. It was noted that there was no long term trend in catch weight at age 3, however since these are partially recruited, the weights may not change as much in the fishery as in the survey; instead, the PR may decline.

There is also a decline in the condition of haddock in 5Z, and processors report about 2-3% less yield from eastern Georges Bank haddock than in past years, corroborating this observation. Yields are poor again in early 2005 summer fishery.

Biomass decline was projected for this resource in the last assessment, but the estimated biomass in 2005 is 50 kT, rather than the 60 kT projected in the 2004 assessment.

Partial recruitment for projections were discussed. The suggestion was made that the same duration should be used for PR as for weight-at-age. It was also suggested that given that the weight at age 3 is about equal to the long-term average weight-at-age for age 2, the average PR for age 2 could be used. The matrix of PR values indicates that age 4 is no longer fully recruited. It has been suggested at TRAC in the past that a shorter-term average, or the final value can be used if there appears to be a trend. It is proposed that the last 3 years be averaged for PR and weights-at-age, and that the fully recruited F be calculated for ages 5-8. It will be clarified whether the difference in methodology for calculating fishery and population weights at age is consistent with the Benchmark procedures.

To be consistent with last year, medium-term projections were to be done with recruitment at both 20 and 40 million.

Projections were to be conducted with average weight-at-age and PR for 2002-04 (however see note below). This reduces the F_{ref} yield, but continues to put heavy reliance on the 2003 year-class. The projections were also to be conducted using weight-at-age and PR for 2004, which are the lowest in the three year block, indicating in the TSR what the F implications would be for ages 5+ if the 23,000 t were taken and the PR and weight at age remain as seen for 2004. A discussion ensued on whether to recalculate YPR, given the observed changes in PR. The conclusion was that until we are convinced that the changes are persistent, we should avoid recalculating it since this would lead to a higher $F_{0.1}$, which may preclude ever reaching the higher biomass levels. If we see low growth rates for a longer period, then there would be a clear rationale for recalculation.

Note: The 2005 rather than the 2002-04 average DFO survey weights at age for population biomass for the projections in the TSR were inadvertently used. The yield is not affected as the three year average weights at age were used for fishery weights at age. The effect of using the 2005 weights at age is a substantial reduction in the total and adult biomass as can be seen by comparing the two sets of results below:

Using 2005 DFO survey weights for population (as in TSR), and assuming F=0.26 (F_{ref}) in 2006 and beyond:

	20 Million Recruits			40 Million Recruits		
	Total Biomass	Adult Biomass	Yield	Total Biomass	Adult Biomass	Yield
2005	115	50	23[1]	115	50	23[1]
2006	153	151	22	153	151	23
2007	161	157	46	166	157	46
2008	193	188	57	203	195	58
2009	145	141	43	163	155	46
2010	119	115		145	137	

Using the three year average survey weights for population (as was recommended by the committee):

	20 Million Recruits			40 Million Recruits		
	Total Biomass	Adult Biomass	Yield	Total Biomass	Adult Biomass	Yield
2005	145	55	23[1]	145	55	23[1]
2006	209	206	22	210	206	23
2007	219	213	46	225	213	46
2008	215	209	57	230	218	58
2009	169	163	43	194	182	46
2010	141	135		176	164	

[1]The reference document will reflect only the population biomass based on the 2005 survey weights at age as reported in the TSR.

MODIFIED TAC STRATEGY FOR EASTERN GEORGES BANK HADDOCK

Rapporteur: S. Gavaris and R. Mayo

The TRAC reviewed a modified TAC strategy for Eastern Georges Bank haddock as requested in the remit from the Canada/USA Steering Committee to the TMGC. Illustrative projection results of yield and biomass trajectories resulting from a harvest strategy that set the TAC to the lesser of the $F_{ref} = 0.26$ or a constant catch cap at 40,000 and 60,000 mt annually were compared with trajectories derived by fishing at F_{ref}. The projection incorporated the impact of the 2003 year-class based on the estimate from the 2004 assessment (~ 900 million fish at age 1) with subsequent recruitment fixed at 20 million fish per year. The projections indicated that total yield constrained only by Fref would increase to about 160,000 mt between 2007 and 2008 before declining and stabilizing at about 30,000 mt at the end of the projection period. Yields constrained by the 60,000 and 40,000 mt catch caps provided constant yields for 8-11 years, respectively, until further constrained by the F_{ref} limit.

The TRAC considered the results of the 2005 assessment for Eastern Georges Bank haddock, noting that the 2003 year-class is now estimated to have been 365 million fish at age 1, a substantial reduction from the estimate of the 2004 assessment. TRAC also reviewed the medium term projections for this stock, noting that the projected yield increases to a maximum of about 57,000 mt in 2008 before declining thereafter. Given these results, it appears that appropriate constant catch caps would apply for only a brief period (1-3 years). Noting this substantial change from the initial comparative projections, the TRAC concluded that a modified TAC strategy is not likely to have the significant impact on annual and cumulative yield or revenue streams as was previously indicated.

Nevertheless, the TRAC discussed the modeling assumptions in detail if the Steering Committee still wishes to proceed with comparative projections and subsequent economic and social analyses of a modified TAC strategy for this stock. It was noted that using a constant recruitment of 20 million instead of 40 million may accentuate any advantages of the modified TAC strategy. The deterministic approach does not provide insight on differences in TAC variability, an aspect that may be influential in the follow-up economic extensions. It was recommended that the input assumptions include:

1. Keep F at or below $F_{ref} = 0.26$.
2. Use 2-stanza recruitment re-sampling from the Empirical Cumulative Distribution Functions below and above about 40,000 mt adult (ages 3+) biomass.
3. Use 3-year average weights at age and partial recruitment pattern as per the medium term projections.
4. Compare the impact of using recent 3-year average weights at age by re-running the projections using long term average weights at age from 1987-2003, but keep the same recent partial recruitment pattern.
5. Model constant catch at 30,000, 40,000, and 50,000 mt, based on an approximation of a 30,000 mt expected sustainable yield at F_{ref}.

6. The time horizon should be sufficient to bring the 2003 year-class into the 9+ group (at least 2012).

The TRAC agreed to review the yield and biomass projections by correspondence.

5Zhjmn YELLOWTAIL

Working Paper:

Stone, H.H., and C.M. Legault. Stock assessment of Georges Bank (5Zhjmn) yellowtail flounder for 2005. TRAC Working Paper 2005/15.

Rapporteur: L. O'Brien

Presentation Highlights

Input data for the latest assessment of Georges Bank yellowtail flounder were reviewed and information was presented for both Canada and the USA on the commercial fishery distribution, landings, size composition, port and at-sea sampling results, catch-at-age and weight-at-age along with a summary of recaptures from Canadian tagging studies. Information was presented from the Yellowtail Benchmark Assessment Review on the estimation of yellowtail discards from the Canadian offshore scallop fishery for 1973-2004 which used by-catch ratios calculated from observed trips prorated by scallop effort data. The by-catch estimates were included for the first time in the revised Canadian CAA for 1973-2004. It was considered best practice to pool all available ALK information from USA port sampling, USA sea sampling and NMFS surveys to compile half-year ALKs that could be applied to the length composition from the Canadian fishery and Canadian discards from the offshore scallop fishery. Changes to the US landings and discards from the benchmark review were relatively minor.

USA catches for 2004 were 6,757 mt, an 82% increase from 2003, with landings of 6,208 mt and discards of 549 mt. The Yellowtail Special Access Program in Closed Area II accounted for a large portion of these landings and discards. The 2004 Canadian catches were 518 mt, down 82% from 2003 and well below the 2004 TAC of 1,900 mt, with landings of only 96 mt and estimated discards of 422 mt. Canadian fishermen were unable to find commercial quantities of yellowtail in 2004, and the directed fishery ceased in September, while US fishermen were able to catch their portion of the TAC before the end of the fishing year. Monitoring of the US catch relative to the TAC allocation required real time landings and discards estimation. Comparison of these estimates with the assessment values for the second half of 2004 showed the monitoring catch approximately 13% below the assessment catch, with the largest differences due to landings.

Ages 3 and 4 dominated both Canadian and US catches in 2004, with age 5 representing a significant portion as well. The Canadian fishery in 2004 was composed mainly of fish in the 31-45 cm size range, while the USA fishery proportionately captured more large fish (31-52 cm), as was the case in 2003. Geographic differences

between Canadian and US fisheries may account for some of the difference in length composition observed in 2004. Most of the US fishery catches (87%) and all of the Canadian catches (100%) occurred during the second and third quarters. Although not used in VPA calibration, a standardized catch rate series for Canadian mobile gear was updated and compared to the DFO spring survey biomass index for stratum 5Z2 (Canadian portion of the Bank < 90m). Canadian mobile gear catch rates showed a strong decline in 2000 and 2001, and have remained at low levels through 2002 and 2003, reaching the lowest level in the series in 2004.

Abundance and biomass indices from DFO, NMFS spring and NMFS fall surveys were presented and discussed along with the spatial distribution of survey catches by age group, and the size composition by sex. During the Benchmark review, the DFO survey indices for 1987-2003 were revised using more borrowed ages (i.e. in addition to the same year NMFS spring survey ALKs). The NMFS spring survey ALKs augmented with first half USA port sampling and sea sampling ALKs were used to derive indices at age. This was considered the best practice for the available data. All three groundfish surveys indicated an increase in abundance from 1995 to 2002 and a decline since 2002, with the 2005 DFO and NMFS spring and 2004 NMFS fall series showing a modest increase from the previous year. The 2002 year-class was dominant in the 2005 DFO/NMFS spring surveys at age 3 age and in the 2004 NMFS fall survey at age 2. Relative abundance at all ages was slightly higher in the current year survey compared to the previous year.

The state of the resource was based on survey observations and the range of results from plausible age structured analytical assessments (VPAs) that used fishery catch statistics and sampling for size and age composition of the catch for 1973 to 2004. The VPAs were calibrated to trends in abundance from three bottom trawl research surveys, NMFS spring, NMFS fall and DFO and a recruitment index from the NMFS scallop survey. Three VPA formulations were examined based on recommendations from the 2005 benchmark assessment review: 1) Base, the same formulation as used in the 2004 assessment, 2) Minor Change, expanded age range from 6+ to 12, dropped surveys for ages 1-3, and did not estimate terminal year ages 1-3, and 3) Major Change, expanded age range from 6+ to 12, split the surveys into separate series in 1995, estimated power functions for the relationship between indices at ages 1-3 and the calculated population abundance at those ages. The Minor Change VPA was not accepted during this TRAC review due to a large change in partial recruitment to the fishery for young ages in 2004 compared to the terminal year of the assessment reviewed during the benchmark. The Base VPA continued to display a retrospective pattern, updating population biomass estimates to lower values than previously determined and compromising interpretation of results, although the magnitude of the retrospective pattern was much less than in previous years. The Major Change VPA did not exhibit a consistent retrospective pattern, with updates both above and below previously estimated values. The Major Change VPA adds parameters to decrease these patterns in residuals and the retrospective, but the mechanism for the changes in survey catchability are not easily explained. These changes in survey catchability are most appropriately thought of as an aliasing of an unknown mechanism that produces a better fitting model. Trends in relative F (catch biomass/survey biomass) and total mortality for ages 2, 3 and 4-5 from the surveys were presented and indicated that

relative F followed a pattern similar to the VPA results (decline after 1994) while total mortality did not (no trend). These patterns suggest inconsistencies between the survey data and the VPA, and were also noted during the benchmark assessment review.

Overall, results from the current assessment showed lower abundance and higher levels of fishing mortality than the 2004 assessment. Age 1+ population biomass for 2005 ranged from 10,000 t to 17,000 t (depending on VPA model formulation), lower than last year's estimate (24,000 t). Although recruitment has improved relative to the early 1990's with several good year-classes since 1996, current estimates for the 2003 year-class ranged from 10-15 million recruits, considerably lower than preceding year-classes. The strong 1997 year-class is now estimated to be only of moderate strength (24-25 million recruits) and is not nearly as large as predicted in past assessments. Fishing mortality on age 4+ showed a strong increase in 2004 and may be at levels comparable to the mid-1980's, well above F_{ref}. This scenario is inconsistent with the perception of recent low exploitation.

Assessment results indicated that catching the TAC of 6,000 mt in 2005 would result in a fishing mortality level greater than F_{ref} and that with an assumed catch of 6,000 mt in 2005, the combined Canada/US catch in 2006 would be 2,100-3,600 mt. At the F_{ref} yield in 2006, age 3+ biomass is expected to increase by either 19% at the beginning of 2007 (Base VPA) or 41% (Major Change VPA). While there was still uncertainty about which model to use, concordance between the results from the two models gave more confidence in the determination of status than in the 2004 assessments. Both models clearly indicate that stock rebuilding is necessary.

Discussion

For the US landings, the apparent decline in the weights at age from the first half to the second half of the year is due to the lack of growth of fish in the latter half of the year. The length-weight equation applied in the first half-year results in a higher pre-spawning weight than the equation applied in the 2nd half-year which results in a lower post-spawning weight for similar size fish.

Because of the lack of kept fish in the US scallop fishery, a regression relationship between scallop landings (meat weights) and yellowtail flounder discards (mt), derived in a previous assessment, was applied to estimate discards instead of a discard to kept ratio. Concern was raised that the relationship was based on a time period when the twine top mesh size was increased from about 4-5" in the early years to about 8-10" in the latter years. If the earlier years were removed from the regression, however, the 2004 estimate of discards would still be similar to the original estimate. It was also noted that if the slope were forced through the origin, the results would still be similar.

Using the regression relationship to estimate discards from the scallop dredge fishery represents a source of uncertainty. Although using scallop effort to estimate discards would be preferable, as was done to estimate discards in the Canadian scallop fishery, this is not easily accomplished using the US scallop data at this time.

The proration of the US landings to stock area were problematic for the 2004 data due to the lack of gear code on the electronically reported dealer data. This problem has been resolved, but other problems persist because of the lack of a unique identifier between the dealer record and the logbook. Recent regulations for 2005 require that the dealer receive a copy of the logbook at the time of the sale.

Length frequency distributions showed relatively little difference between fish caught inside and outside of Closed Area II (CA II). This conclusion is supported by preliminary results from the tagging data that show frequent movement of yellowtail in and out of CA II, as well as out of the stock area. In addition, the western boundary of the 5Zjm area is not that far from CA II, well within the range of distances traveled by tagged fish. Although the length frequency is similar both in and outside of CL II, there is still the possibility that the larger fish inside the closed areas are older. There is not sufficient data from the SAP (Special Access Program) or the NEFSC surveys to check this, however, data from the DFO survey may be sufficient to determine the average age of fish inside and outside CA II.

During the benchmark TRAC, the dome-shaped partial recruitment estimated by some models in recent years was thought to be due, in part, to inaccessibility of large fish in CA II. The lack of differences in the length frequency inside and outside of CA II suggests that this is not a mechanism that can explain dome-shaped partial recruitment for this stock.

Discards in the US trawl fishery were derived using the observer data and compared to estimates derived from the logbook data. Although logbook discards are lower than observer discards, the trends by quarter are similar. The large drop in discards seen in the 4th quarter in both data sets was also seen in both the cod and haddock fisheries and is presumably due to a decrease in effort.

The total catch estimated for monitoring the US TAC was 13% lower than the dealer reported landings and estimated discards used in the assessment for the second half of 2004. The difference in the landings can be accounted for by the difference in the hail weights reported in the VMS versus the weights recorded in the dealer record. Discard estimates were similar until the 4th quarter when effort in the trawl fishery was used in the TAC monitoring instead of the D:K as in the previous 3 quarters. The TRAC recommends that the TAC be monitored using both VMS hail weight and electronic dealer reports data. In addition, the TRAC recommends that an agreed upon methodology be used for discard estimation in both the assessment and for TAC monitoring.

The distribution of yellowtail appears to have shifted to the west, away from the 'Yellowtail Hole' in the last 2 or 3 years. The Canadian fleet experienced very low catch rates in 2004 and was not able to find quantities of yellowtail in the same areas fished in prior years, yet, the US fleet was able to find yellowtail to the west, outside of CA II. Data to detect changes in environmental conditions are not available on this scale, however, an analysis on a larger scale, i.e. between 5Z4 and 5Z2 may provide insight as to the mechanism that would cause a shift in the distribution. A study done by Chris Glass from Manoment, MA. found a seasonal temperature gradient across CA II that

may be influencing movements of yellowtail. A change in food availability may also be influencing the distribution. A shift in distribution most likely occurred in the early 1990's when yellowtail started to appear east of the Hague Line in areas they had not previously been found.

Mean weights at age have been increasing since the mid 1990's but declined in 2004. The trend is different than that observed for cod and haddock suggesting a different mechanism for the shift. The trend in yellowtail is coincident with the increase in the number of older fish in the stock.

The discrepancy between estimates of relative F and survey Z may be related to the precision of the age data. The estimate of relative F (catch biomass / survey biomass) is an aggregated index whereas the survey Z estimates are based on age data. Relatively low precision in the aging of yellowtail could possibly contribute to the variation in survey Z. This was discussed at the benchmark TRAC and the age data was considered reliable although perhaps noisy. Another confounding factor may be growth. Estimation of relative F relies on an accurate measurement of catch. The decline in relative F since 1993 coincides with the change in the US collection of catch statistics in 1994.

The minor change model recommended by the benchmark TRAC, that excluded survey indices for ages 1-3 in the calibration of the VPA, did not provide reasonable estimates of recent recruitment. The fishery changed in 2004 with fewer younger fish and more older fish, however, the estimated PR from this formulation does not reflect the change in the age composition. The TRAC recommended replacing the minor change model with the base run formulation from the 2004 assessment. This model formulation provided a more realistic PR for the younger ages. The residual pattern was still present, but the retrospective pattern was dampened for 2004 relative to 2003, although it still persisted in the earlier years.

The major change model, which splits the time series in 1995 and applies a power function to survey indices for ages 1-3 (1995 to present) had less of a pattern in the residuals and a similar PR vector to the base 2004 formulation. The mechanisms for large changes in the survey catchability are not clear, however, these changes can be thought of as aliasing unknown mechanisms.

The TRAC agreed that although the discrepancy between the survey indices and the fishery is not resolved by either the base run or the major change model, the two VPA models do bracket the uncertainty in the data.

During a subsequent rerun of the Major Change and Base VPA assessment models in August 2005 to evaluate the NMFS stock rebuilding plan, it was discovered that the age 1 DFO survey index was inadvertently included in the Base VPA model formulation at the June 2005 meeting. The effect of excluding this index results in an increase in the 2005 estimate for adult (age 3+) biomass from 17,000 t to 19,000 t and a reduction in 2004 age 4+ F from 1.17 to 1.16. The revised projection for age 3+ catch biomass in 2006 is 4,200 t and is higher than previously estimated from the Base VPA formulation with age 1 included (3,600 t). Consequently, the Transboundary Resource Assessment

Committee Status Report (TSR 2005/03) and the Reference Document (2005/04) were revised accordingly.

DFO SURVEY COMPARATIVE FISHING

Rapporteur: J. Hunt

A short presentation was made to TRAC providing an overview of DFO comparison fishing studies conducted during the 2005 RV survey. The studies are designed to provide conversion factors for vessel effect and originate from the expected withdrawal of one offshore vessel from the East coast fleet and the potential need to use an alternate platform for the survey.

The survey design consists of side-by-side tows by the two vessels (*Alfred Needler* and *Teleost*) with both vessels using the standard Western IIA bottom trawl. Full trawl mensuration using Scanmar was included in the design.

During the 2005 survey, 31 comparison tows were completed. Vessel breakdown prevented the full complement of 100 comparison tows being achieved. The *Alfred Needler* was the designated index vessel and was able to complete the full survey coverage for eastern Georges Bank and provide the 2005 indices of abundance.

Results for the 31 tows have not been interpreted, but preliminary data analysis suggests similar trawl performance characteristics for both vessels and similar catches of cod, haddock and yellowtail. Comparison studies are scheduled to be continued during the July 2005 survey in 4VWX and the 5Ze survey in 2006.

Recent developments in the designation of vessels may eliminate the need for *Needler-Teleost* conversion factors. The *Needler* is expected to remain in service and will conduct the index survey until the end of 2009, when a replacement vessel is expected to be available. Conversion factors to be used or developed at that time are presently unresolved.

APPENDICES

Appendix 1 : List of Participants

Participant	Affiliation/Address	Telephone	Fax	E-mail
Jon Brodziak	NMFS/ Woods Hole	(508) 495-2365		Jon.brodziak@noaa.gov
Dan Caless	NMFS / Gloucester	(978) 281-9377		Daniel.caless@noaa.gov
Donald Clark	DFO / SABS	(506) 529-5908		clarkd@mar.dfo-mpo.gc.ca
Claude d'Entremont	IMGC / Yarmouth	(902) 762-2522	(902) 762-3464	inshore@inshore.ca
Stratis Gavaris	DFO / SABS	(506) 529-5912		gavariss@mar.dfo-mpo.gc.ca
Pramod Granapacraraju	DFO / SABS			pramod@dal.ca
Bette Hatt	DFO / SABS	(506) 529-5920	(506) 529-5862	hattb@mar.dfo-mpo.gc.ca
Joe Hunt	DFO / SABS	(506) 529-5893	(506) 529-5862	huntjj@mar.dfo-mpo.gc.ca
Marc Johnston	NB Dept. of Agric., Fish. and Aquac. / St. George	(506) 755-4000	(506) 755-4001	Marc.johnston@gnb.ca
Derek Knox	DFO / SABS	(506) 529-5959		knoxd@mar.dfo-mpo.gc.ca
Chris Legault	NOAA Fisheries / Woods Hole	(508) 495-2025		Chris.Legault@noaa.gov
Ralph Mayo	NOAA Fisheries / Woods Hole	(508) 495-2310		Ralph.mayo@noaa.gov
Judith Maxwell	SFIFA >45' / Clarks Harbour	(902) 745-0994		Sfifaa20@eastlink.ca
Corey Mood	Wood's Harbour, NS	(902) 723-2360	(902) 723-2880	
Tim Nickerson	TMGC / Smithville	(902) 768-2535	(902) 768-2259	
Tom Nies	NEFMC / Newburyport	(978) 465-0492		tnies@nefmc.org
Robert O'Boyle	DFO / BIO	(902) 426-3526		oboyler@mar.dfo-mpo.gc.ca
Loretta O'Brien	NMFS/ Woods Hole	(508) 495-2273		Loretta.o'brien@noaa.gov
William Overholtz	NOAA Fisheries / Woods Hole	(508) 495-2256		william.overholtz@noaa.gov
Julie Porter	DFO / SABS	(506) 529-8854		porterjm@mar.dfo-mpo.gc.ca
Clary Reardon	NS Dept. Agric. & Fish. / Halifax	(902) 424-0349	(902) 424-1766	reardonc@gov.ns.ca
Kent Smedbol	DFO / SABS	(506) 529-5976	(506) 529-5862	smedbolk@mar.dfo-mpo.gc.ca
Heath Stone	DFO / SABS	(506) 529-5880		stoneh@mar.dfo-mpo.gc.ca
Lou Van Eeckhaute	DFO / SABS	(506) 529-5938		Van-eeckhautel@mar.dfo-mpo.gc.ca
Stanley Wang	NMFS	(978) 281-9225		Stanley.wang@noaa.gov
Tom Warren	NMFS – Gloucester	(978) 281-9347		Thomas.warren@noaa.gov

Appendix 2. Meeting Terms of Reference

For the following resources:

Eastern Georges Bank cod
Eastern Georges Bank haddock
Georges Bank yellowtail flounder

- Apply the benchmark assessments to report on the status of the stocks, updating results for the latest information from fisheries, including discard estimates, and research surveys and characterize the uncertainty of estimates.

- Document the size and age compositions of catches (both landings and discards) in the USA and Canadian fisheries. Describe how landings and discards in these fisheries are sampled for size/age composition, and summarize the amount of sampling (number of samples, number of length and age measurements), stratified as appropriate (e.g., gear type, calendar month/quarter, market category, etc). Compare the USA and Canadian size/age compositions, identify any differences, and discuss possible reasons for these differences.

- For a range of values for total catch in 2006, estimate the risk that
    - the 2006 fishing mortality rate would exceed 0.18 (cod), 0.26 (haddock) and 0.25 (yellowtail flounder) respectively; in the case of yellowtail flounder, if the benchmark assessment review indicates a change in the fishing mortality reference, the risk of exceeding that revised estimate should be provided as well
    - the biomass at the beginning of 2007 would not achieve a 0%, 10% or 20% increase compared to the beginning of 2006

- Conduct medium term forecasts assuming that the stocks are exploited at constant fishing mortalities of 0.18 (cod), 0.26 (haddock) and 0.25 (yellowtail flounder; if the benchmark assessment review indicates a change in the fishing mortality reference, the forecasts using that revised estimate should be provided as well) during 2006-2009, and provide the catches and beginning year biomasses (total and spawning stock) in 2006, 2007, 2008 and 2009, and also the beginning year biomasses in 2010.

- Review the methodology used by the NMFS Fisheries Statistics Office to determine total catch from USA fisheries and, if necessary, make recommendations for improvements in the methodology to be used in the following fishing year. Review estimates of discards from Canadian fisheries.

- Other matters.

Appendix 3. Meeting Agenda

14 June 2005 – Tuesday	
08:30 – 09:00	Welcome and Introduction (Chair)
09:00 – 10:00	Methodology to Estimate Total Catch in US Fishery (?)
10:00 – 12:00	Discard Estimates in Canadian Fishery (?)
12:00 – 13:00	Lunch
13:00 – 15:00	Eastern Georges Bank cod (O'Brien, Hunt)
15:00 – 17:00	Eastern Georges Bank haddock (Brodziak, Van Eeckhaute)
15 June 2005 – Wednesday	
08:30 – 10:30	Georges Bank yellowtail flounder (Legault, Stone)
10:30 – 11:30	Report from Ageing Workshop (Van Eeckhaute)
11:30 – 12:00	Comparative fishing in Canada (Hunt)
12:00 – 13:00	Lunch
13:00 – 14:00	Presentations arising at the meeting (Brodziak, Gavaris, Overholtz)
14:00 – 15:00	Report Preparation
15:00 – 17:00	Report Preparation
16 June 2005 – Thursday	
08:30 – 12:00	Report Review
12:00 – 13:00	Lunch
13:00 – 17:00	Report Review
17 June 2005 – Friday	
08:30 – 12:00	Report Review
12:00	Adjournment

Appendix 4. Minutes of Public Meeting in Yarmouth, Nova Scotia on 26 May 2005

The purpose of this public meeting was to review 2004 and 2005 survey and fishery observations in relation to what they indicate about stock status and how they can be interpreted for 2006 advice. Summaries of available information were presented by DFO.

There was also a brief discussion of the potential implications to management of the transboundary Georges Bank stocks as a result of diminished capacity to support assessments due to broadening demands to address ecosystem considerations and reduced resources.

The discussions are summarized below.

General Issues

Comment: While the fishing industry is being expected to contribute more support towards fisheries management, concern was expressed about the objectivity of assessment results produced by consultants that are hired by industry.

Question: Is there any realistic way to have DFO reconsider the changes that are planned?
The driving force is the reduced budget, for which there is little scope to alter. However, input from the fishing industry on how we can work together best with available resources is possible.

Comment: Industry needs a commitment by DFO on what aspects of fisheries science and management they will support and for how long. Industry would like to have a conversation about setting up a contract with DFO for the longer term management of fisheries.

Question: Doesn't the inefficiency of DFO survey vessels and gear and the fact that they are unable to "catch fish" during the surveys result in underestimating the population in assessments that use these survey results?
DFO Science has to standardize various aspects of survey (vessel, gear, sampling protocol, random selection of tows) in order to make the time series comparable from one year to the next. The objective is not to capture as many fish as possible but to monitor trends in relative abundance over time.

Question: What does the US use for its survey net?
They use a Yankee 36. It was stressed that the survey is not to be used as an absolute measure of abundance but as a relative measure of abundance.

5Zjm Haddock

Question: Why was there such a large decline in the 2005 DFO survey estimate for the 2003 year-class?
Survey estimates are inherently variable from one year to the next, the strength of this year-class is still quite high relative to past estimates of other year-classes. The DFO survey provides one estimate of year-class strength, other estimates are provided by the NMFS surveys. The 2003 year-class may have been more aggregated than expected in 2005 DFO survey as evidenced by a very large tow of 2003 year-class haddock made by the Teleost which was surveying at the same time as a comparison vessel.

Question: Why does the mean weight at age for age 2 (2003 year-class) differ between the survey and the catch?
The survey uses a codend liner to catch small fish. Fishery selectivity is different and only the larger age 2's are captured by the fishery. Also, the survey occurs in February while the fishery is during the last half of the calendar year when the fish have grown some.

Comment: We have seen variability in estimates of year-class strength for 4X haddock, but the magnitude of the decline for GB haddock seems very large for 2003 year-class.

Question: Why have average weights at age declined?
Several factors can influence weight at age including food availability, water temperature and competition.

Question: Is there a connection between stock biomass and weight at age?
Yes, possibly.

5Zjm Cod

Question: Why can't DFO Science get the numbers sooner?
There were complications with a new reporting system that was introduced in the US during 2004.

Question: How is the USA fishery monitored?
The US fishing year starts May 1 and ends April 30. Starting May 1, 2004, the US fishery operated on a quota basis. There is suspicion about the accuracy of both Canadian and USA monitoring systems and we need to develop confidence in each other's monitoring. It was noted that fishery monitoring would be a good topic for a TMGC public consultation.

Question: Is pursuing consistent management with USA resulting in improved conservation?
It seems to be working much better at present, especially for cod which is now covered by quota; relations between both nations is improving.

Comment: According to industry, the longline survey catch was up 18% compared to 2003. While it looks like there was an increase in the results presented by DFO, it is not clear what the actual percentage was and should be confirmed and compared. Fixed gear is more efficient at capturing cod than haddock whereas mobile gear selects for haddock and this difference should be taken into consideration.

Comment: The Canadian industry longline survey has been voted down and will not be conducted in 2005. This survey has not been used as an index because there is no comparable index on the US side. Although it is difficult to consider the notion of starting a new/different type of index, industry needs to give it some thought, taking into consideration that a new survey would require a number of years to establish a useful time series.

Comment: Industry stated that fixed gear catch rates were good from the 2005 Canadian longline survey; i.e. 30,000 lbs were caught on 4,500 hooks (with observers present). Industry feels that there are more cod out there than what DFO Science indicates and suggested that the cod quota should be higher, while the quota for haddock should be lower.

Comment: Industry expressed concern over the conclusion by Science that the fixed gear survey is not useful, especially since it has been conducted for over 10 years. Some suggested that this was the first time they have heard that it cannot be used because there is no comparable series for the US side of the management area.

Comment: The by-catch estimate of the 2000 year-class from the offshore scallop fishery is larger than expected. Science does not have sufficient samples to determine if this is in fact the case or if it is due to random variation.

Question: Is the assessment of recruitment similar to what the survey is now indicating?
Comment: Surveys have generally picked up recruitment but there is a lot of variability.

5Zhjmn Yellowtail

Comment: The presentation stated that there was no directed fishery for yellowtail flounder in 2004, which was not quite correct. There was a directed fishery but when no yellowtail were found in commercial quantities, it was not considered feasible to continue.

Comment: The fishery caught more females during the early part of the fishery and more males later on.

Question: What is the sharing formula based on?
The sharing formula between the USA and Canada is based on survey distribution using a 10 year rolling average along with the fixed historical utilization.

Comment: There were 3 scallop draggers in the yellowtail hole for the last month, but to date there has been no observer coverage near the Yellowtail Hole.

Comment: The 2004 US fishery was closed while waiting for the amount of yellowtail discards from the scallop fishery, then reopened when low levels of discards were reported but an overrun resulted after the reopening.

Comment: The US fishery was allowed a certain number of trips for the Special Access Program for Closed Area II in 2004. (The fishery would stop when either the quota or the number of trips was reached).

Comment: During TMGC deliberations in 2004, the US was asking for a higher quota for yellowtail while Canada wanted a lower quota. An intermediate level between the two was recommended.

Question: How old do yellowtail get?
Answer: They can get to 8 or 9 years old. Ages 2, 3 and 4 are recently the most dominant ages.

Question: How much has the survey index dropped?
Answer: The overall index is up but the proportion of the biomass is down for the Canadian side.

Participants of Public Meeting in Yarmouth, Nova Scotia on 26 May 2005

Name	Affiliation	Fax	e-mail or Tel. #
Roger Atwood	SFIFA		902-637-2764
Ray Belliveau	Charlesville Fisheries	902-762-3158	902-762-2405
Doug Bertram	N.S.F.P.A	902-837-5165	902-837-5163
Joel Comeau	Royal Harbour Seafoods Inc.	902-645-3844	jc@royalharbourseafoods.com 902-645-3778
Adlai Cunningham	Sea Star Seafoods Ltd	902-745-2129	adlai@seastarseafoods.com; 902-745-2925
Gam Davis	VCF6A	902-742-4884	Cameron.30@ns.sympatico.ca; 902-742-9879
Austin Denton		902-834-2039	
B d'Entremont	Acadian Fish	902-762-3316	902-762-2700
Claude d'Entremont	Inshore Fisheries Ltd.	902-762-3464	inshore@inshore.ca; 902-762-2522
Evan d'Entremont	West Point Fisheries	902-762-3489	902-762-3421
Gordon d'Entremont	Island Rock Fisheries	902-762-3237	
Gilbert Donaldson	DFO Science, Port Sampler, Yarmouth		donaldsong@mar.dfo-mpo.gc.ca; 902-742-0895
Stratis Gavaris	DFO Science	506-529-5862	GavarisS@mar.dfo-mpo.gc.ca; 506-529-5912
Brian Giroux	SFMGFA		SFmobile@fox.nstn.ca
Jorgen Hansen	DFO Fisheries Management		HansenJ@mar.dfo-mpo.gc.ca; 902-426-9046
Judith Maxwell	SFIFA	902-745-0361	sfifaa20@eastlink.ca;
Corey Mood	J.L. Mood Fisheries	902-723-2880	902-723-2360
Denny Morrow	NSFPA	902-742-1620	fishpackers@klis.com; 902-742-6168
Tim Nickerson	SFIFA	902-768-2259	902-768-2535
Sheldon O'Donnell	SFIFA	902-745-2799	902-745-2799
George Rennehan	N.S.F.G. 45-65'	902-874-2052	sandefish@klis.com;
Darrell Ross	fisherman		
Rob Stephenson	SIF Canada Ltd.	902-648-3012	rob@sif.is; 902-648-3427
Heath Stone	DFO Science	506-529-5862	StoneH@mar.dfo-mpo.gc.ca; 506-5295880
Peter Van Buskirk	SCGGA	902-875-2446	
Lou Van Eeckhaute	DFO Science	506-529-5862	Van-EckhauteL@mar.dfo-mpo.gc.ca; 506-529-5893
Glen Wadman	D.B. Kenney	902-839-2070	glenw@dbkenneyfisheries.com
Troy Waybret	SFIFA	902-945-2112	twaybret@eastlink.ca; 902-745-1576